PATENT APPLICATION OF

Si-Nin Quan

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San Jose, CA

for

TITLE : REVOLUTIONARY CONNECTIONS FOR SPARK PLUGS AND SPARK PLUG WIRES

~~[Form SB/08A -- Information disclosure statement by applicant is attached hereto, disclosing relevant prior art references]~~

FEDERALLY SPONSORED RESEARCH

Not Applicable

SEQUENCE LISTING OR PROGRAM

Not Applicable

BACKGROUND OF THE INVENTION

This invention relates to secondary ignition system for internal combustion Engines, specifically to an improved positive locking function and easy ~~[removal]~~ DISCONNECTION for conventional spark plugs and spark plug wires connections.

Variety of connections have been used in spark plugs and plug wires couplings, the most popular style is click-in, push to connect and pull to disconnect. Push to connect will create confusion sometimes whether said connections are secured or just being snug? Bench tests revealed free spinning of components from said connections even though they are tight and secured. Self-seperation occurs occasionally due to aging, repeated services, thermal cycles, vibration and high voltage conduction. If said self-seperation should happen, it will cause pollution, poor performance and possibly internal engine damage. ~~Pull~~ to disconnect is another negative factor, when pulling is exercised there is tendency of tearing components apart, ~~rubber~~ boot being torn possibly damaging the core in the plug wire, misfire would happen. In addition to surrounding high temperature, confined space, service personnel always have to face frustration, struggle or even minor bodily injuries in the field of servicing said connections. Numerous prior arts offered remedies, particularly U.S.PAT.no(5,332,394) Frost, Jul 1994 and U.S.PAT.no (4,810,198) Sturdevan, Mar 1989. Since all connections are couplers concentrating upon one end will not reach ultimacy, the essence of ~~my~~ invention is synchronizing the other end which is the spark plug ~~tip~~ an all-time solution.

SUMMARY

The invention will bring maintenance, services and repairs to a new boundary by providing simple, effortless procedure for servicing spark plugs and plug wires connections. The positive locking feature ensures an EPA issue-nonmisfiring, the self-pop-up released feature is a phenomenon to all related service personnel.

DRAWINGS

Drawing figures

Fig 1 shows conventional spark plug.

Fig 2 shows new configuration of spark plug ~~tip~~

Fig 3 shows top view of ~~thrust~~ washer with inside diameter ±6mm, outside diameter ±9mm, due to various spark plug ~~tip~~ design, inside diameter should be recalibrated to fit individual application.

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SEQUENCE LISTING OR PROGRAM

Not Applicable

BACKGROUND OF THE INVENTION

This invention relates to secondary ignition system for internal combustion engines, specifically to an improved positive locking function and easy disconnection for conventional spark plugs and spark plug wires connections.

Variety of connections have been currently used in spark plugs and spark plug wires couplings, the most popular style is click- in, push to connect and pull to disconnect. Push to connect sometimes will create confusion whether said

connections are secured or just being snug? Bench tests revealed free spinning of components from said connections even though they are tight and secured. Self-seperation occurs occasionally due to aging, repeated services, thermal cycles, vibration and high voltage conduction. If said self-seperation should happen, it will cause pollution, poor performance and possibly internal engine damage. Pulling to disconnect is another negative factor, when pulling is exercised there is a tendency of tearing components apart, silicone cover boot being torn and possibly damaging the core in the spark plug wire, misfire would happen. In addition to surrounding high temperature, confined space, service personnel always have to face frustration, struggle or even minor bodily injuries in the field of servicing said connections. Numerous prior arts offered remedies, particularly U.S.PAT.no(5,332,394) Frost, Jul 1994 and U.S.PAT.no (4,810,198) Sturdevan, Mar 1989. Since all connections are couplers and unions, concentrating upon one end will not reach ultimacy, the essence of the present invention is synchronizing the other end which is the spark plug terminal, an all-time solution.

SUMMARY

The invention will bring maintenance, services and repairs to a new boundary by providing simple, effortless procedure for servicing spark plugs and spark plug wires connections. The positive locking feature ensures an EPA issue-nonmisfiring, the self-pop-up released feature is a phenomenon to all related service personnel.

DRAWINGS

Drawing figures

Fig 1 shows a conventional spark plug.

Fig 2 shows a new configuration of a modified spark plug terminal.

Fig 3 shows top view of a washer with inside diameter ±6mm, outside diameter ±9mm, due to various spark plug terminal design, inside diameter should be recalibrated to fit individual application.

Fig 4 shows a coiled spring with free height ±14mm, outside diameter ±9mm.

Fig 5 shows a spark plug terminal with a built-in slot-pin± 9mm in length.

Fig 5A shows top view of a spark plug terminal with a built-in slot-pin.

Fig 6 shows a new configuration of a spark plug terminal after being assembled.

Fig 7 shows a spark plug wire terminal with a stationary silicone cover boot.

Fig 7A shows a built-in metal clip 14, silicone cover boot not shown.

Fig 8-8A shows front and rear views of a new embodiment of a spark plug wire terminal with two predetermined slots and omission of metal clip 14.

Fig 8B shows top view of Figs 8 and 8A.

Fig 9 shows an adaptor for a modified spark plug terminal and a conventional spark plug wire terminal, an alternative embodiment.

Fig 10 shows a new configuration of said modified spark plug terminal and said modified spark plug wire terminal being connected, a preferred embodiment.

Fig 11 shows said adaptor for a modified spark plug terminal and a conventional spark plug wire terminal being connected, an alternative embodiment.

REFERENCE NUMERALS IN DRAWINGS

10	built-in slot-pin	12	washer
14	metal clip	16	spark plug wire terminal
18	silicone cover boot	20	spark plug wire
22	predetermined slots	24	adaptor

DETAILED DESCRIPTION

Preferred embodiment

Drill a predetermined hole through upper portion of a conventional spark plug terminal, install a coiled spring over said plug terminal, install a washer on top of said spring, insert a predetermined slot-pin or cotter-pin through the hole to hold said washer and spring in place. The said assemblage can also be put

together with built-in slot-pin in manufacturing process of spark plugs. The metal clip in a conventional spark plug wire terminal will be omitted, predetermined slots are built in spark plug wire terminal, recommend material for said modified spark plug wire terminal be superior than those currently used. Silicone cover boot will be made to slide along spark plug wire instead of being stationary, same modification can be applied to Hemi style long-reached plug wire and distributorless individual ignition coil design.

Alternative embodiment

An adaptor can be built with a conventional spark plug terminal at one end which will fit a conventional spark plug wire terminal, while the other end with predetermined slots will fit in a spring-loaded spark plug terminal. The advantage here is no modification needed for conventional spark plug wires, but non-locking character still exists.

OPERATION

The invention provides simple steps to connect and disconnect spark plug wires from spark plugs. For disconnection, slide silicone cover boot 18 (Fig 7) upward to expose enough terminal of spark plug wire 20 (Fig 7), press said terminal down, turn counterclockwise to release, since spark plug terminal is spring-loaded, said wire terminal will be pushed out after it clears the slot pin. Compare to what mechanics are doing these days like twisting, pulling and yanking, this self- pop-up is a phenomenon. For installation, hold saids park plug wire terminal against slot pin (can be felt easily), once spark plug wire terminal clears said slot pin, press down and turn clockwise to lock, the coiled spring will urge upon said spark plug wire terminal, forms a positive locking position, slide down said silicone cover boot firmly. With conventional snap and pull connections, even experienced mechanics can not be certain said connections are secured or just being snug, now it is black and white !